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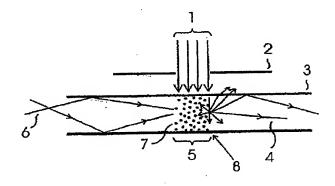
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		最終頁に続く

(54)【発明の名称】 光データ転送システム

(57)【要約】

本発明は、光導波路によるデータの光伝送のためのデー 夕転送システムであって、エミッタおよび/または受信 機が、前記光導波路に沿って変位するか、または異なる 位置に配置されるように構成されたシステムに関する。 前記光データ転送システムは、随意の位置の散乱中心に より、光を結合または減結合することができるという点 で卓越している。



【特許請求の範囲】

【請求項1】 光信号またはエネルギーを伝送するための装置であって、光 導波路によって互いに結合された少なくとも1つの光放出手段および少なくとも 1つの光受信機を備え、光が、前記光導波路の両端および/または前記光導波路 に沿った少なくとも1ヶ所において外部からそれぞれ結合または減結合される装 置において、

前記光導波路が、外部から結合または減結合するための前記少なくとも1ヶ所 において、それぞれ結合または減結合するための光散乱中心を含むことを特徴と する装置。

【請求項2】 前記散乱中心が、光を結合および減結合するための予め決められた位置で前記光導波路に永続的に存在することを特徴とする、請求項1に記載の装置。

【請求項3】 前記光導波路の性質が、前記散乱中心のそれぞれ場所または 性質を外部からの刺激により制御することができるように設計されていることを 特徴とする、前記請求項のいずれか1項に記載の装置。

【請求項4】 前記光導波路が、それぞれ電磁界もしくは電磁波により、または粒子によっても散乱を支配することができる材料を含むことを特徴とする、 請求項1または請求項3にそれぞれ記載の装置。

【請求項5】 前記光導波路が、体積、構造、分子間もしくは分子内の力、または物質の少なくとも1つの状態を変化させることにより前記散乱中心が効果を生じる材料を含むことを特徴とする、前記請求項のいずれか1項に記載の装置

【請求項6】 前記光導波路が、好ましくはそれぞれ光屈折効果、光アドレス可能効果、熱非線形性効果、流動学的効果により散乱を支配することができる材料を含むことを特徴とする、前記請求項のいずれか1項に記載の装置。

【請求項7】 前記光導波路が、ガラス、合成樹脂、または光を案内するのに適するその他の材料から成り、好ましくはファイバまたは平坦な光導波要素として設計されていることを特徴とする、請求項1~6のいずれか1項に記載の装置。

【請求項8】 前記光導波路が、それぞれ固体、液体またはガラスを随意に 充填される中空として設計されることを特徴とする、請求項 $1\sim7$ のいずれか1項に記載の装置。

【請求項9】 少なくとも2つの異なる光源が、散乱作用を制御し、信号を転送するために設けられていることを特徴とする、請求項1~8のいずれか1項に記載の装置。

【請求項10】 単一のエネルギー源が、散乱作用を制御し、信号を転送するために設けられていることを特徴とする、請求項1~9のいずれか1項に記載の装置。

【発明の詳細な説明】

[0001]

発明の分野

本発明は、光導波路によりデータを光伝送するためのデータ転送システムであって、送信機および/または受信機が光導波路に沿って変位させるか、または異なる位置に配置されるシステムに関する。こうしたデータ転送システムは、たとえば移動式クレーンと静止制御ユニットとの間でデータを伝送するためのクレーン装置またはその他の搬送システム内の線形構成に使用される。こうしたデータ転送システムの用途のもう1つの分野は、互いに対して回転可能な部品、たとえばコンピュータ断層写真撮影機では、X線管を支持する回転子と検出器との間にある部品と、画像データを処理および表示する固定分析ユニットとの間における伝送である。

[0002]

先行技術

光導波路を利用して動作する一般的な転送システムの場合、光は、光導波路の一方の端部に結合され、次に光導波路を通過して、光導波路の他方の端部に至り、ここで適切な受信機により再度分析される。このシステムに基づいて、多くの異なる改良型が周知されるようになり、濾波器により数種の波長を同時伝送することが可能であるか、またはたとえばY結合器により数ヶ所に転送することすら可能である。しかし、こうしたシステムは、信号を光導波ファイバの何れかの位置に結合もしくは減結合するか、または光導波ファイバの何れかの位置から離して結合もしくは減結合するのには適さない。このために、その他の様々な技術が周知されている。

[0003]

米国特許第4,962,986号には、屈折率が環境内の屈折率より高い結合 媒体が直接ファイバコアに接触して、光を光導波ファイバに結合および減結合し 、光を光導波ファイバから離して結合および減結合するシステムが開示されてい る。したがって、ファイバ内で伝達される光は、結合媒体内に偏向される。この 構成は、結合媒体をファイバコアに直接接続しなければならないという決定的な 欠点を示す。したがって、このシステムは、もっぱら予め決められた不変の位置に結合する用途にのみ適する。しかし、こうしたシステムは、送信機および受信機が互いに対して移動可能な構成には殆ど適用されない。なぜなら、結合媒体は、殆どの場合は非常に細く、かつきわめて敏感なファイバコアに沿って高速度で摺動しなければならないからである。

[0004]

より好都合な装置は、米国特許第5,297,225号に開示されている。この特許では、光は、光伝導性媒体の外側に形成されたノッチを介して外側から内部に結合し、媒体内に案内できる角度の屈折により偏向される。こうした伝送装置は、結合が不変的に予め決められた位置に行われる実際的な用途に適する。原則として、こうした伝送装置は、移動可能なユニット間の伝送にも適する。なぜなら、光は、無接点でユニットに結合されるか、またはユニットから離して結合されるからである。実際問題として、クレーン設備または回転変圧器システムの場合のように、かなり長い移動経路が必要な場合、光導波媒体に沿った多数のノッチにより、許容できない強度の減衰が生じる。

[0005]

強度の減衰という欠点をなくす方法では、蛍光システムが開発され、国際出願公開第WO95/35605号に記載されている。この特許では、光導波ファイバは、蛍光性色素でドーピングされる。外部から入射する光は、蛍光性色素の分子によって吸収され、次に刺激されて光を放出する。光の放出は、球状光源に類似する方法で、あらゆる方向に生じる。したがって、光は、光導波ファイバ内で生成され、わずかな部分は、このファイバの受光角度内でもあるため、ファイバ上を通過することができる。この方法の利点は、蛍光性色素の分子による波長の変換にある。したがって、蛍光性色素の分子により放出される光のエネルギーレベルは、分子により吸収される光のエネルギーレベルより基本的に低い。したがって、放出される光は、比較的長い波長を呈する。蛍光性色素の分子により放出される光のエネルギーは不十分なため、蛍光性色素の同種のその他の分子内に吸収されず、その結果、再び蛍光が放出される。したがって、蛍光性色素の分子でドーピングされた光導波ファイバは、蛍光作用により生成された光の場合は比較

的弱い減衰を示す。その結果、長さまたは直径が大きい転送システムを効率的な方法で実施することができる。次に、このシステムは、刺激光によるエネルギー供給が停止した時に、蛍光効果が瞬時に停止せず、減衰が急上昇するという著しい欠点を呈する。これは、それぞれ速度または帯域幅の点で、転送信号が制限される原因になる。試験所で試験された蛍光性色素を有する最善のファイバは、ナノ秒台の時定数を示し、したがって数百MBaud以下のみの用途に適し、GBaud範囲には適さない。

[0006]

帯域幅のこの制約は、国際出願公開公報第98/00936に記載されている 転送システムにより回避される。上記のシステムに類似する方法では、光は外側 から、色素でドーピングされた光導波ファイバ内に結合される。しかし、この場 合、光は、電子アレイが、使用される蛍光効果ではなく、むしろ活動的な刺激に より変換される材料の誘導放出である。この構成の欠点は、エンジニアリングに 関して、たとえば波長マルチプレクサおよびポンピングする光源などに多額な費 用を要する点である。したがって、こうした構成は、工業規模の広範な一連の用 途には未だ適さない。

[0007]

もう1つの方法は、たとえば、ガラスファイバ内の光屈折材料(米国特許第4,749,248号)によるか、またはガラスファイバ上の外皮(PCT特許公開公報第WO99/04309号)の形態で応用される光格子を介した光の結合に基づく。

[0008]

以下に記載する説明では、「光導波路」という用語を使用する。この用語は、 好ましい実施態様に関連する。なぜなら、特にかなり長距離の場合、減衰しない 状態で1つの光導波路上にのみ案内されるからである。本発明の主題は、当然、 同じ効果を有するその他すべての種類の光導波路にも適用される。

[0009]

発明の説明

本発明は、光データ転送システムであって、上記の欠点を示さず、特に、長距

離に沿って高速度のデータ速度で非接触転送するのに適するシステムを比較的安 価な製造コストで提供するという課題に基づく。

[0010]

この課題に関する創意に富む1つの解決方法は、請求項1に定義する。本発明 の改良は、従属請求項の主題である。

[0011]

本発明の装置は、光導波路、好ましくは光ファイバであって、光がそれぞれ光 導波路に結合されるか、または光導波路から離して結合される位置付近に散乱中 心を含む光導波路から成る。こうした散乱中心は、光を異なる方向に偏向させる 機能を有する。光導波路に沿った側面結合の場合、光は、散乱中心によって、光 が光導波路内を通過することができる立体角で少なくとも部分的に偏向される。 側面減結合の場合、光導波路内を案内される光は、光導波路の外側の方向に少な くとも部分的に偏向される。

[0012]

分かりやすくするため、「散乱中心」という用語は、好ましい応用分野に対応させるために、本明細書では複数形で使用する。当然、単一の散乱中心のみを使用しても、同じ効果で本発明を実施することができる。散乱中心は、原則として非常に小さいので、事実上、殆どの場合、互いに近接する複数のこうした散乱中心が原則として使用される。

[0013]

散乱中心、つまり散乱の効果は、故意に殆ど特定の方向に整列させていない多数の粒子、好ましくは微細粒子を伴う光学的効果である。これは、粒子を囲む媒体に対するこれら粒子の異なる光学特性に基づく。たとえば、散乱粒子の屈折率または透過率は、異なる値を示す。対照的に、反射は、好ましくは巨視的な効果であり、たとえば、ほぼ好ましい方向の光の偏向を誘発する。

[0014]

本発明の特に好都合な実施態様では、散乱中心は、光導波路内に永続的に存在 する。本発明のこうした実施態様は、特に、光が常に予め決められた位置に結合 または減結合する時に好都合である。これは、たとえばバスシステムの場合に言 えることである。この構成は、それぞれ信号の結合または減結合の位置にだけ対応する少数の散乱中心のみを有するため、減衰は通信網を介して実質的に減少し、光導波路の長さの大部分または実質的部分上で散乱する構成を提供する光導波路と対照的である。

[0015]

本発明のもう1つの好都合な実施態様では、光導波路の性質は、散乱中心の場 所または性質が、それぞれ外部からの刺激によって制御されるように設計される 。したがって、散乱中心は、画定された様々な位置に形成することができる。た とえば、散乱中心の場所は、それぞれ光結合または減結合のための素子の運動が 変化するにつれて、動的に変えることができる。したがって、散乱中心は回転運 動をたどることができ、回転運動の場合には回転時に連続的な光結合または減結 合を可能にする。随意に、散乱中心の場所だけではなく、散乱中心の性質を支配 することが可能である。散乱中心の性質は、本質的に散乱量を支配する。原則と して、散乱中心のサイズまたは密度などのパラメーターを支配することができる 。たとえば、結合素子と減結合素子との間の距離が短い場合、散乱中心を伝送経 路上で低散乱レベルに調節することができる。なぜなら、このような場合、経路 に沿った損失は低く、その結果ごくわずかな信号部分のみをそれぞれ結合または 減結合することになるからである。対照的に、かなり長距離の場合、より強度の 結合または減結合動作をそれぞれ達成するために、当然、散乱中心をより高度の 散乱レベルに調節する。したがって、散乱中心の性質を制御して、たとえば伝送 経路の距離に依存する減衰または損失を補正すると、より低い動的レベルを示す 受信機を使用することができる。

[0016]

同様に、散乱中心を適応させることにより、その他の影響、たとえば異なる送信機の出力、受信機の感度、または伝送経路に沿った欠点もしくは不具合などを補正することもできる。散乱中心の性質の制御は、散乱中心を単に形成または除去することも当然含む。

[0017]

本発明のもう1つの好都合な実施態様では、光導波路は、好ましくは電磁界も

しくは電磁波、または粒子によって散乱を支配できる材料を含む。光の伝達に対する影響が最も少なくなるように、この材料は、非散乱状態における減衰が低いことが好ましい。それぞれ電磁界または電磁波が影響する可能性を考慮して、外部からの散乱作用を特に調整することが可能である。この場合、特に、非接触制御は、問題なく可能である。電磁波の特殊なケースは光である。特に、より高度な出力密度を有する光の場合、散乱中心は特定の材料中に形成される。たとえば、こうした場合、光導波路は、高度の出力密度を示す光源により照射されて、散乱中心が形成される。次に、出力密度を変えることにより、散乱中心によって生じる散乱効果を支配することができる。

[0018]

本発明のその他の好都合な実施態様では、光導波路は、散乱中心が、画定された物理的特性により効果的な材料を含む。こうした物理的特性としては、特に、体積、構造、分子間もしくは分子内における力の影響の変化、または物質の少なくとも1つの状態が挙げられる。特に、光導波路内に包囲された小粒子内でこうしたパラメーターが変化する場合、当該小粒子の屈折率または減衰を変化させて、散乱を生じさせることができる。

[0019]

本発明のその他の好都合な実施態様の場合、光導波路は、特に少なくとも以下 の効果により材料の散乱を支配することができる特殊な特性を示す材料を含む:

- 光屈折効果
- 光アドレス効果
- 熱非線形性効果
- 流動学的効果

[0020]

こうした材料が混ざった光導波路の1ヶ所を刺激すると、局所的に可逆性の散 乱中心が形成される。これは、刺激が加わらなくなった時に元の状態に戻る散乱 を意味する。当然、刺激がなくても散乱中心が存在し、刺激に反応した場合にの み元に戻る材料を使用することも可能である。散乱中心を刺激領域に好ましくは 局所的に形成するために、減衰は、光導波路の他の部分では低い状態を保つ。

[0021]

本発明の好都合な一実施態様は、光導波路が、光導波用途に適する材料、たと えばガラスまたは合成樹脂などから製造されるが、ファイバまたは平坦な光導波 要素の形態で実施される態様である。光導波ファイバの形態で実施する場合、信 号の分散を少なく保つことができる。したがって、広帯域信号伝送は、長距離の 場合も可能である。このほか、長距離の伝送の場合にも、減衰を低レベルに維持 して、受信機の弱い動的応答のみを要するようにすることができる。

[0022]

本発明のその他の好都合な実施態様では、光導波路は、随意に固体、液体または気体を充填される中空の本体の形態として構成される。こうして、本発明の装置を特に単純に製造することが可能になる。たとえば、合成樹脂の単純な可撓性管材料を封体部として延伸し、所望の特性を示す適切な液体を充填することができる。

[0023]

本発明のもう1つの有利な実施態様では、別個の信号またはエネルギー源はそれぞれ、散乱作用または信号伝送を制御するために個々に使用される。たとえば、第1のエネルギー源は、これら散乱中心が所望の散乱を呈するように、エネルギーの供給により所望の供給場所を刺激するために行われる。第2のエネルギー源、たとえば変調レーザは、散乱中心により変調レーザの光を光導波路に結合することにより、情報を伝達するために使用される。

[0024]

本発明のもう1つの実施態様は、単一のエネルギー源が結合または減結合場所に存在して、散乱中心を制御し、情報を伝達するための設備である。たとえば、特に効率的なレーザは、エネルギーの結合に使用され、所定のエネルギーを光導波路に結合して散乱効果を制御し、それと同時に情報を伝達する。

[0025]

以下に、本発明について、一般的な本発明の着想を制限せずに、実施態様の例 として、図面に関して例示的に説明する。

[0026]

図1は、本発明を一般的な形態で示す。光導波路(3)は光(6)を案内し、 光(6)は、導波路内を低損失または低減衰でのみ伝播することができる。光導 波路は、局所的に限られた領域(5)に散乱中心(7)を含む。一方、光導波路 内を伝播する光(6)は、こうした散乱中心上に散乱し、散乱した光は全方向に 伝播する。したがって、散乱光の一部は、光導波路からも出射する。外部光源からの光(8)は、光導波路を均等に照射することができる。この光は、散乱中心 に入射すると、全方向に均等に散乱する。光(4)の一部は、光導波路の長手方 向に散乱し、光導波路内に案内される。制御可能な散乱中心を有する実施態様の 場合、追加のエネルギー(1)が随意のダイアフラム(2)を介して供給され、 散乱中心を制御する。このダイアフラムは、この場合、光導波路の照射の制限を 正確に画定する機能を有し、したがって、散乱中心は、正確に画定された領域内 にのみ形成される。

[0026]

図2は、データ転送システムの代表的な構成を示す。上の図は、光導波路に沿った任意の位置で光を光導波路に結合し、光導波路の一方の端部で光を減結合する状態を示す。この場合、エミッタ(12)は、光導波路が延在する方向に光(8)を出射する。さらに、供給エネルギー(1)は、この場所の散乱中心を活性化させる。エミッタからの光の一部はこれら中心で散乱し、光導波路(3)内で光導波路の一方の端部にある受信機(13)まで案内される。

[0027]

対向方向における光の伝達は、同様に動作する。この作用の一例を下の図に示す。エミッタ(10)は、光(9)を光導波路(3)の一方の端部に供給する。この光は、散乱中心から離れて結合され、追加のエネルギー(1)により刺激されて、受信機(11)により分析される。

[0028]

図3は、散乱中心が、追加のエネルギーで刺激されない状態で存在する場合の 別法による構成を示す。この場合、散乱中心は、ダイアフラム(2)により刺激 エネルギー(1)から遮断される領域(5)に存在する。光導波路(3)の他の 部分は、刺激エネルギーにより照射され、その結果、散乱中心が消滅し、光導波 路は、光導波路に一般的な特性を有するという作用を生じる。

[0029]

図4は、様々なタイプのエネルギーまたは信号結合の例であって、信号が光導 波路の任意の場所に供給される例をそれぞれ示す。このメカニズムは、当然、類 推上、光導波路に沿った任意の場所における信号減結合に適用される。

[0030]

上の図では、高出力の信号(41)は、光導波路(3)に結合される。この場合、信号の出力は高レベルに設定され、散乱中心は、光導波路の光が照射される場所に生成され、その結果、この中心は信号の一部を光導波路の伝播方向に結合する。真ん中の図は、散乱中心を刺激または制御するデータ信号(1)およびエネルギー(8)が、別個の光源から光導波路(3)に結合される好ましい応用例を示す。

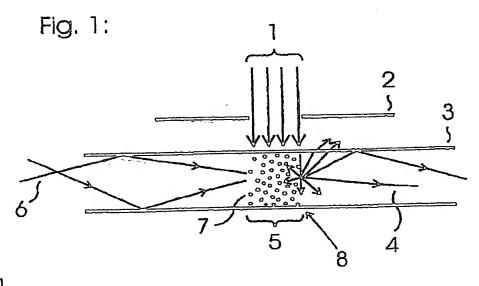
[0031]

下の図は、光以外のエネルギーの形態、たとえば電離放射線(42)が光導波路に結合されて、散乱中心が形成される場合を示す。この場合、変調光(8)は、やはり散乱中心の領域に結合されて、情報を伝送する。

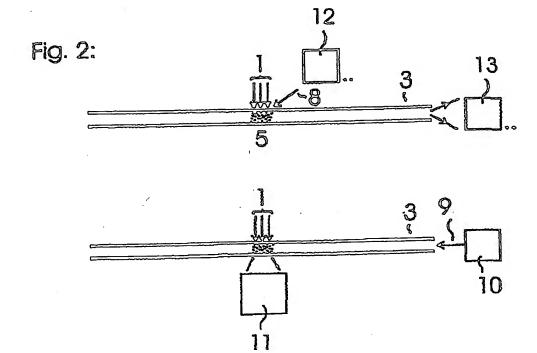
【図面の簡単な説明】

- 【図1】 本発明の一般的な実施態様を示す。
- 【図2】 データ転送システムの構成を示す。
- 【図3】 刺激を受けない状態で散乱中心が存在する構成を示す。
- 【図4】 刺激または信号結合の様々なモードをそれぞれ示す。

【図1】



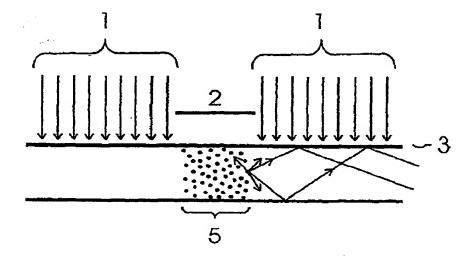
【図2】



(14)

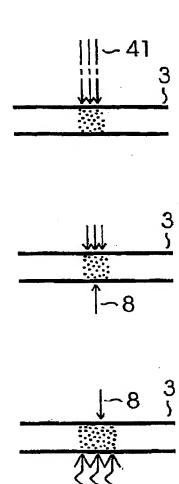
【図3】

Fig. 3:



【図4】

Fig. 4:



【国際調査報告】

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Cantinu legary '	ation) DOCUMENTS CONSIDERED TO BE RELEVANT Citation of document, with aidication, where appropriate, of the relevant passages	Relevant to claim No.
	US 5 881 200 A (BURT MICHAEL GRAHAM) 9 March 1999 (1999-03-09) abstract column 2, line 64 -column 3, line 6	5
	WO 99 57584 A (BYRNE BOB :WATERBURY ROB (US); UNIV SOUTH FLORIDA (US)) 11 November 1999 (1999-11-11) abstract	8
,, P	WO 00 36979 A (GEN ELECTRIC) 29 June 2000 (2000-06-29)	
		-

(18)

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information on patent family members

PCT/DE 01/02120

			101701 01702120			
Patent docu cited in search		Publication date		Patent tamily member(s)		Publication date
WO 98443	57 A	08-10-1998	AU	8008198		22-10-1998
			MO	9844367		08-10-1998
			DE	19880399		07-09-2000
			ΕP	0970396		12-01-2000
			ЭP	2001516469		25-09-2001
			nz	6075915	A	13-06-2000
US 47339	29 A	29-03-1988	us	4884860	A	05-12-1989
			US	4799748	A	24-01-1989
US 59742	12 A	26-10-1999	JP	10307228	Α	17-11-1998
			FR	2763141	A1	13-11-1998
US 58812	00 A	09-03-1999	CA	2199506	A1	04-04-1996
			DE	69519384	D1	14-12-2000
			DE	69519384	T2	23-05-2001
			ΕP	0783784	A1	16-07-1997
			ES	2153495	T3	01-03-2001
			MO	9610282	A1	04-04-1996
			JP	10506502	Т	23-06-1998
WO 99575	34 A	11-11-1999	AU	3873599	Α	23-11-1999
			EΡ	1116057	A 1	18-07-2001
			MO	9957584	A1	11-11-1999
WO 00369	79 A	29-06-2000	EP	1056395	A1	06-12-2000
			MO	0036979	Al	29-06-2000

Form PCTcSA/210 (potent family annex) (July 1992)

フロントページの続き

(81)指定国 EP(AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, I T, LU, MC, NL, PT, SE, TR), OA(BF , BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG), AP(GH, G M, KE, LS, MW, MZ, SD, SL, SZ, TZ , UG, ZW), EA(AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, B Z, CA, CH, CN, CO, CR, CU, CZ, DE , DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, I S, JP, KE, KG, KP, KR, KZ, LC, LK , LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, P T, RO, RU, SD, SE, SG, SI, SK, SL , TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW

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【要約の続き】

